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...THE...

AMERICAN FERTILIZER

"That man is a benefactor to his race who makes two blades of grass to grow where but one grew before."

Vol. 103 JULY 14, 1945 No. 1

Applying Experimental Work to Cotton Farming

By RALPH W. CUMINGS*

Head, Department of Agronomy, Agricultural Experiment Station, Raleigh, North Carolina

THE extent to which the North Carolina farmer is able to compete with farmers from other areas in the production of cotton in the postwar period will be determined by the efficiency of his operations. Regardless of the conditions of world trade the spread between cost of production and price, and not the price itself, will decide whether any given individual can afford to continue growing cotton. Thus, it behooves every cotton grower, whether his operations be large or small, to cut his cost per unit of production as much as possible. This does not necessarily mean a reduction in expenditure of labor or cash per acre, although for some operations it undoubtedly will.

There are a number of fixed and nearly constant costs, such as land rent, cultivation, seed, etc., involved in the production of any crop, regardless of the yield per acre. Over quite a range of conditions, the cost of producing each pound of cotton tends to decrease with an increase in yield per acre. We can, therefore, afford to give quite a little attention to practices which will increase yields. Much to increase yields already has been done. Production in North Carolina in 1944 was almost as great as in 1929, but this production was obtained on a little less than half the acres grown in 1929. According to a recent study made by representatives of the North Carolina Agricultural Experiment Station, the North Carolina Agricultural Extension Service, and the Bureau of Agricultural Economics, U. S. Department of Agriculture cooperating (*6*)†, it is estimated that the per-acre yields of cotton under normal weather conditions could be increased approximately 44 per cent above those prevailing now by putting into practice the information which we now have on cotton production. The improvement in practices includes better use of fertilizers and lime, more satisfactory placement of fertilizers used, a wiser choice of rotations and fuller utilization of cover-crops, the maintenance of pure seed of the best available varieties, better cultural practices, seed treatment, and insect control. If acreage decreases, the placing of cotton on soils to which it is best adapted would further increase the average yields on the acres grown.

Now let us look at some of these factors separately and examine the evidence on how they may be manipulated to reduce the per-pound cost of producing cotton.

Fertilizers

In 1943, it is estimated that North Carolina farmers used approximately 203,300 tons of fertilizer on 856,000 acres of cotton, an average of 475 lbs. per acre (*3*). This fertilizer probably accounts for more than 50 per cent of the total production obtained. The actual yield per acre under weather conditions less favorable than normal was 338 lbs. of lint per acre. Under normally favorable weather conditions, it is estimated that the yield would have been 375 lbs. (*6*). It is further estimated that only 42 per cent of the farmers fertilized their cotton at levels comparable to those recommended by the Experiment Station and that the per-acre yield would be increased 15 per cent if the Station recommendations were followed.

The exact amount of fertilizer which should be applied to cotton will vary with

*Reprinted from "Better Crops with Plant Food," May, 1945.

†Numbers in parentheses refer to literature listed at the end of the article.

soil conditions and rotations. The Experiment Station recommendations for North Carolina are given in Agronomy Information Circular No. 138. Depending on the soil condition, 18 to 50 lbs. of nitrogen, 45 to 72 lbs. of phosphoric acid, and 24 to 72 lbs. of potash are suggested. Although the amounts of plant nutrients taken up by the entire plant are fairly large, the quantities permanently removed from the soil in lint and seed are modest. A crop of 500 lbs. of lint with its accompanying 750 lbs. of seed removes about 27 lbs. of nitrogen, 12.5 lbs. of phosphoric acid, and 12.5 lbs. of potash.

Best yields, however, will require the application of larger amounts of fertilizer. A large number of experiments over a wide range of soils and over a period of many years show an average increase in yield of 13.5 to 15.5 lbs. of seed cotton for each pound of nitrogen applied between rates of 8 and 32 lbs. per acre. Increased yields of somewhat smaller order are obtained under many conditions up to 48 lbs. per acre.

Responses to phosphoric acid have been somewhat smaller averaging about 4 lbs. of seed cotton per pound of phosphoric acid applied at rate of 16 lbs. per acre, and 2.5 lbs. when applied at rates of 32 to 40 lbs. per acre.

Responses to potash group themselves into two categories depending on whether or not the soil is exceptionally deficient in potash. Nine to 15 lbs. of seed cotton per pound of potash applied are common on potash-deficient soils while 6 to 8 lbs. or less are perhaps more typical on soils not so deficient. The increased emphasis on peanuts and soybeans is undoubtedly increasing the number of situations in the former category.

The effects of potash go further than merely increasing the yields. Moore and Rankin (*2*) in a study on the use of potash to control "rust" obtained an increase of 37 per cent in weight of seed cotton per boll, 33 per cent in weight of individual seeds, 39 per cent in strength of fiber, and a decrease of about 50 per cent in the proportion of thin-walled fibers from the application of 50 lbs. of potash per acre.

The following responses to side-dressing with nitrogen and with a combination of nitrogen and potash (Table 1) were obtained by J. A. Shanklin and County Agent B. E. Grant in a demonstration on the John Bazemore farm in Bertie County in 1944. All the plots were fertilized at planting with 400 lbs. of 4–10–4.

It should be re-emphasized here that, although the cotton crop responds to rather liberal fertilization, the lint and seed do not remove large quantities of minerals. Crops such as corn and peanuts following cotton can make good use of the residues of mineral fertilizers applied to cotton and should be charged with a portion of the fertilizer applied to cotton.

How should these fertilizers be formulated to achieve the greatest efficiency in production? A survey in 1940 revealed that the average fertilizer sold in North Carolina contained 450 lbs. of inert filler, exclusive of all secondary element material such as dolomite, keiserite, etc. The overhead cost of bagging, shipping, and handling a ton of fertilizer without any plant food has been estimated at from $10 to $12.70 per ton. This 450 lbs. of filler then are actually costing the farmer about $3.00 in each ton of fertilizer he buys. Furthermore, the inclusion of low analysis grades permits the inclusion of low-grade materials which have a higher amount of salt per unit of plant food. This increases the hazard of fertilizer injury to the germinating seeds which often results in poor stands. More about this later. The minimum change which should be made in our fertilizer grades would be the elimination of those grades which can contain appreciable amounts of filler, allowing the farmer to use his money to purchase more plant food.

Next, let us look at the limestone put in fertilizers to make them neutral or basic. Increases in yield of 266 lbs. of seed cotton

TABLE 1.—RESPONSES TO SIDE-DRESSING WITH NITROGEN AND A COMBINATION OF NITROGEN AND POTASH.

Treatment	Yield lbs. seed cotton per acre	Seed		Per cent thick-walled fibers	Neps per square inch	Yarn appearance grade
		Grade	Value per ton			
Not side-dressed	820	71.0	$39.76	52	51	C–
Side-dressed with 100 lbs. per acre nitrate of soda	1,040	85.0	47.60	63	21	B–
Side-dressed with 100 lbs. per acre nitrate of soda, 150 lbs. per acre muriate of potash	1,487	107.5	60.20	68	13	B+

were obtained in North Carolina (*7*) from the use of dolomitic lime as a neutralizing agent in the fertilizer. The widespread occurrence of magnesium deficiency in eastern North Carolina would indicate the desirability of continuing this practice. However, according to figures released by AAA, the use of lime in North Carolina increased from 30,584 tons in 1936 to 672,863 tons in 1943. We may do well to look ahead to the day when grades are made available which replace the space now used by dolomitic limestone with more plant food for the farmer who has limed his soil adequately.

Fertilizer Application

The National Joint Committee on Fertilizer Application has done an outstanding job over a period of many years in sponsoring studies which have shown how fertilizers should be placed in the soil to minimize injury to germinating seedlings and thereby obtain full stands and maximum yields. These studies are reported fully in the various annual proceedings of the meetings of the Committee. Collins (*1*) summarized 9 years' results on cotton yields as follows:

Treatment	Yield of seed cotton in pounds per acre
Fertilizer in bands under seed	1,111
Fertilizer placed to the sides and below seed level	1,321
Fertilizer mixed with soil under seed	1,174
No fertilizer	675

In years when moisture conditions are very favorable, satisfactory results may be obtained from conventional methods of placing the fertilizer under the seed; but when moisture conditions are unfavorable, very poor stands and retarded growth may result. The evidence seems to favor placement of the fertilizer in bands 2 to 3 inches to the side and about 1 inch below the seed.

Side-placement becomes progressively more important as the rate of fertilization increases. Skinner, Nelson, and Whittaker in 1944 obtained a difference of 134 lbs. of seed cotton in favor of side-placement when a 6–8–4 was applied at 400 lbs. per acre and an advantage of 393 lbs. when the fertilizer was applied at 700 lbs. per acre.

Recent work (*4*) has shown that the salt index of the fertilizer is an important factor in determining the placement requirements. Fertilizers formulated with low analysis materials are likely to have a higher salt content per unit of plant food and therefore give more injury to germination than the higher analysis grades if used to supply equivalent amounts of plant food.

The greatest stumbling block to the realization of the maximum returns lies in the equipment available to the farmers, and especially the small farmers, for applying the fertilizer to the soil. This is a place in which the fertilizer industry and the farm equipment industry could cooperatively make an outstanding contribution to Southern agriculture. It presents a real challenge to progressive men in both industries, and I feel sure that the industries will meet this challenge.

Placement of the fertilizer band in the proper relation to the seed requires a combination planter and fertilizer distributor. Such a machine not only makes possible the realization of benefits of improved stands and increased yields attendant upon correct placement but also can reduce the man hours required for planting. The once-over machine described by Giles and Collins (*5*) is designed to do in one trip what one man and one mule do in 5½ trips by the common conventional method. This machine is now being manufactured by a commercial company. Satisfactory two-mule and tractor machines for side-placing the fertilizer are available commercially for farmers who can use this type of equipment.

Better Varieties

The realization of returns from the use of better seed is partly the responsibility of the plant breeder and partly that of the farmers through individual and organized effort. The more progressive cotton breeders are now not only attempting to develop high-yielding strains resistant to the common diseases encountered in the areas served but are utilizing all available knowledge to develop cottons with inherently superior fiber quality which will spin yarns of the characteristics desired by the textile industry. Length, strength, fineness, and uniformity of fiber characteristics are among the factors considered.

Organized one-variety communities can then take cottons which possess superior qualities and plant 1 per cent of the acreage annually in seed direct from the breeder. By multiplying this, taking precautions to avoid mixing seed at the gin, the entire community acreage will be in cotton of uniform characteristics with no seed more than three years from the registered source.

(Continued on page 30)

International to Build Two Plants

Plans for the construction of two fertilizer plants by International Minerals and Chemical Corporation have been announced by Louis Ware, president of the corporation.

A new $100,000 plant will be built in Mason City, Iowa, and a $200,000 plant will be erected in Hartsville, S. C., to replace a plant owned by the corporation there which was destroyed by fire in December. Both will be completely modern throughout, and equipped with all the latest labor-saving machinery.

The Mason City plant is being built to meet growing demands for International fertilizers in Iowa and Minnesota and will produce a complete line of mixed fertilizers for corn, alfalfa, small grains, clover and truck crops, Mr. Ware said.

The new plant at Hartsville, which will be larger than the original one because of increasing demand in the South Carolina area, will produce mixed fertilizers and manufacture superphosphate.

Construction on both plants will begin soon and they are expected to be in operation in time for the Spring shipping season in 1946.

Secretary Anderson on Food Subsidies

Speaking before the Advertising Federation of America, New York, Secretary of Agriture Clinton B. Anderson said: "I have already started discussions as to the possibility of the eventual removal of all food subsidies." He said, however, they have a tendency to stick. The metal subsidies were introduced to stimulate the production of metals badly needed for the war. Now we have ample stocks of metals, but the subsidy is still with us. "The food subsidies," he said, "may be difficult to eliminate, but the job has to be done, and if it is not to have serious implications for the producer, it must be done when the demand is good and the price is strong.

"I have spoken of producers and consumers," he said, "but I do not like these words. They give a false impression; they create the picture of two different groups of citizens with opposite interests. As a matter of fact the producers are the consumers and the consumers are the producers. Unless a man has food, clothing, and shelter—which are articles of consumption—he can't produce. And unless he produces—assuming that he is not in a hospital, or in jail or temporarily out of a job—there is no way under our economy by which he can continue indefinitely to consume. By and large I don't like any of the words that seem to divide Americans into specialized groups or classes—words like laborer, capitalist, farmer, business man or bureaucrat. We aren't a country of conflicting groups; there is hardly a household, hardly an individual, whose interests do not cross and overflow group boundary lines."

No Shortage of Sulphuric Acid

The supply of sulphuric acid is adequate to meet all requirements, War Production Board officials told the members of the Inorganic Acids Industry Advisory Committee at a recent meeting, WPB reported on June 30th.

It was the opinion of the majority of the committee members that within the next two months controls should be lifted from the allocation of sulphuric acid, except in Area 10, WPB said. The committee indicated that it would be advisable to continue allocation of sulphuric acid in Area 10 until V–J day.

WPB pointed out that the distribution problem in Area 10, which includes Montana, Wyoming, Colorado, New Mexico, Utah, Idaho, Washington, Oregon and California, is such that continued allocation would be beneficial to consuming and supplying industries. The distribution problem in the western area is most acute in California, they added.

Disposal of spent acid from Ordnance owned and operated sulphuric acid plants was discussed. The committee recommended that all such plants be closed down when the supply situation reaches the stage where the disposal of spent acid coming from these facilities seriously interferes with the operation of privately owned plants.

Peat Production Declines

The U. S. Bureau of Mines reports a production of 57,987 tons of peat during 1944, compared with 60,002 tons in 1943 and 86,503 tons in 1941. Wartime labor shortage is the cause of this drop in output. Production was concentrated largely in the Central Atlantic and Middle West States. Of the peat sold in 1944 all but 3 per cent was used for soil improvement, 75 per cent being for direct application and 22 per cent being used in mixed fertilizers.

Mid-Season Application of Fertilizers*

By CHARLES B. SAYRE

New York Agricultural Experiment Station, Geneva, N. Y.

ALTHOUGH it is generally best to apply most of the fertilizer for a crop before that crop is planted, there are often times when side-dressing applications of fertilizers to vegetable crops early in July are profitable.

Supplies of available nutrients in the soil are tremendously influenced by the weather. This year the weather has been such that mid-season application of fertilizers may be especially profitable, particularly of nitrogen and potash, for many vegetable crops.

Supplementary nitrogen fertilizers may be needed this year because of the following unusual combination of weather conditions: (1) Due to the heavy snow cover last winter the ground did not freeze throughout extensive areas in New York; consequently, there was a continual percolation of water through the soil and a loss of nitrates from leaching. (2) Copious and long-continued spring rains this year caused further loss of nitrates from leaching. (3) The cold wet spring retarded nitrification or the natural formation of nitrates in the soil through the action of soil bacteria. (4) An additional weather factor that may result in the need for additional nitrogen fertilization has occurred in many fields where rye or other cover crops could not be plowed under early because the soil was too wet. If the cover crop, particularly rye, continued to grow unusually tall because the soil was too wet to plow until shortly before the cash crop was planted, the application of additional nitrogen may prove very advantageous. This is because the bacteria which decompose the organic matter of the cover crop require large amounts of nitrogen and for a few weeks after the cover crop is turned under these bacteria will compete with the cash crop for the available supply of nitrogen in the soil. As a result the cash crop may not obtain an adequate amount of nitrogen for satisfactory growth until late in the season. Extra nitrogen plowed under with the cover crop is the best way to meet this need, but the application of a side dressing of some nitrogen fertilizer to the cash crop may prove very profitable if extra nitrogen had not previously been applied.

*Reprinted from "Farm Research," New York Agricultural Experiment Station, Geneva, N. Y.

Nitrogen Sources

Nitrogen fertilizers are most efficiently used if applied more nearly in proportion to the needs of the crop than is the case of phosphorus and potash fertilizers, because any large excess of nitrogen is more likely to be lost by leaching since soils have no capacity to "fix" nitrogen once it has been changed to the nitrate form. Organic nitrogen fertilizers and ammonia nitrogen fertilizers enter the colloidal complex in the soil and are not readily lost by leaching, but they are constantly being converted to the nitrate form which is very mobile in the soil and readily leached.

Sandy soils, which are particularly suitable for vegetable growing, are most likely to respond profitably to side dressings of nitrogen and often of potash fertilizers. The nitrogen fertilizers most commonly used for side dressing vegetable crops are nitrate of soda, sulphate of ammonia, and ammonium nitrate. Ammonium nitrate solutions may also be used in irrigation lines or ejected from tanks moving along the rows.

Nitrate of soda contains 16 per cent nitrogen, sulphate of ammonia 20 per cent, and ammonium nitrate 32 per cent. In general, it is seldom profitable to apply more than 200 pounds of nitrate of soda or 150 pounds of sulphate of ammonia, or 100 pounds of ammonium nitrate per acre at one time. These rates apply approximately equivalent amounts of nitrogen. If the crop needs more nitrogen it is generally more effectively utilized by repeating the side dressing about three weeks later.

Keep Away from Foliage

In applying nitrogen fertilizers care must be taken to prevent the fertilizer adhering to the foliage. If any of these fertilizers stick to the foliage, they will burn it and may do more harm than good. Granular nitrate of soda may safely be broadcast with a cyclone seeder or by hand over such crops as beets or tomatoes if applied when the foliage is

dry. These granules are fairly large and will bounce off the dry foliage without adhering or burning.

Ammonium nitrate granules are much smaller and lighter and are more likely to stick to the foliage, and because of their greater nitrogen content they may burn the foliage severely. The irregular crystals of sulphate of ammonia also are likely to adhere to the foliage. For this reason, both of these fertilizers should be applied along the row so they do not come in contact with the foliage. All of the fertilizers may be easily applied with an attachment to the cultivator; consequently, an excellent time to apply a side dressing to tomatoes, sweet corn, or beets is at the last cultivation. Each of these crops is likely to give a very profitable return from a nitrogen side-dressing thus applied.

Demand Increases with Age

During the first six weeks of growth of beets, tomatoes, cabbage, and sweet corn, the plants take up relatively small amounts of fertilizers, but from then on the uptake of nutrients from the soil increases very rapidly. For example, an acre of tomatoes (3,000 plants) will take up only about 10 pounds of nitrogen, 5 pounds of phosphoric acid, and 10 pounds of potash in the first six weeks they are in the field. But in the next six weeks they will take up about 50 pounds of nitrogen, 25 pounds of phosphoric acid, and 90 pounds of potash, and a high rate of absorption continues to the end of the season.

Similarly, corn plants absorb only about one-fourth of their total plant food during the first eight weeks after planting with the rate of absorption being greatest during the ninth and tenth weeks. Consequently, side dressings applied about six weeks after these crops are planted are likely to be most timely and very effective in overcoming deficiencies of nitrogen or potash.

Applying part of the nitrogen for tomatoes as a side-dressing often gives better results than applying a very large amount before planting because too much nitrogen early in the season may produce an excessive vine growth and delay the development of fruit. When the fruit begins to develop, however, it requires a very large amount of nitrogen and if it is not adequately supplied from the soil, nitrogen will be moved from the leaves to the fruit, resulting in premature dying of the lower leaves. Consequently, a side dressing of nitrogen (and often of potash) when the fruits are first forming usually results in profitable increases in yield of early fruit as well as larger total yields.

Needs Indicated by Crop

The appearance of the growing crop is the best guide to the need for mid-season application of fertilizers. A lack of sufficient nitrogen is indicated generally by slow growth and uniform (not mottled) pale green or yellow color of the entire leaves. In the case of beets the foliage may turn dark red instead of maintaining the deep green characteristic of an ample supply of nitrogen. At the first indication of a deficiency of nitrogen the grower is likely to find it very profitable to apply a side dressing of any one of the three nitrogen fertilizers just discussed.

A lack of sufficient phosphorus is usually indicated by stunted growth while the foliage remains darker green than normal.

Unfortunately, it is seldom profitable to apply a side dressing of phosphorus fertilizers because of the difficulty of applying the phosphorus so it will be available to the crop. This is because phosphorus, unlike the nitrogen fertilizers which are quickly dissolved and carried down into the soil with the first rain, becomes "fixed" in the soil where it is applied. If applied as a top-dressing for a cultivated crop, it will remain in the surface soil where the soil is too dry for root growth and where cultivation would keep the roots cut off. To be available to the growing crop, phosphorus must be applied deeply in the zone of active root growth. To do this the fertilizer must be drilled in deep bands and if this is done too close to the plant it will result in severe root pruning and injury to the plant. It can be done early in the season, however, if care is taken to keep far enough from the row to avoid severe root pruning. Generally, with vegetable crops, it is best to apply all of the phosphorus fertilizer before the crop is planted.

Lack of an adequate supply of potash is usually indicated when the margins of the leaves turn brown. It is most likely to occur on sandy or gravelly soils. A top-dressing of 100 to 200 pounds of muriate of potash applied along the row with an attachment to the cultivator or by hand will often give profitable returns with tomatoes, beets, and sweet corn and all of the vine crops. Seasonal conditions markedly affect the available potash in the soil. Records from the oldest experiment station in the world, at Rothamstead, England, show that in seasons such as the first five months of this year, characterized by heavy rainfall, cool temperature, and little sunshine, top dressing with potash fertilizers is most likely to be profitable.

May Sulphate of Ammonia

There was little change in the by-product sulphate of ammonia figures for May, as reported by the U. S. Bureau of Mines. Production increased slightly to 69,218 tons, an advance of 7.9 per cent over April. Sales still are running ahead of production, with 75,985 tons shipped during May. As a consequence, stocks on hand at the end of the month were only 22,252 tons, the lowest reserve in several months.

	Sulphate of Ammonia Tons	Ammonia Liquor Tons NH_3
Production		
May, 1945	69,218	2,427
April, 1945	64,139	2,340
May, 1944	70,027	2,738
January–May, 1945	333,603	11,951
January–May, 1944	340,986	13,531
Sales		
May, 1945	75,985	2,208
April, 1945	69,743	2,373
May, 1944	50,983	3,030
Stocks on Hand		
May, 1945	22,252	659
April, 1945	28,773	596
May, 1944	45,236	731
April, 1944	26,598	662

Southern States Cooperative to Build New Plant

Authorization to build a fertilizer plant at Nashville, Tenn., was given the management of Southern States Cooperative by the board of directors in session in Richmond, Va., June 26th and 27th.

This announcement was made by W. G. Wysor, general manager of the cooperative which has a membership of 178,000 farmers in Virginia, West Virginia, Kentucky, Maryland, and Delaware.

"The new fertilizer plant, to cost an estimated $400,000, will be built as soon as the restrictions on construction will permit," Mr. Wysor said. "Its output will be available to farmers in Kentucky where fertilizer usage is on the increase and demand is strong from farmers for fertilizer manufactured and distributed cooperatively. This plant will be one of four fertilizer factories owned by the cooperative, and it, like the others, will be operated on a cooperative basis, its net savings being returned to users in the form of partonage refunds. The fertilizer will be made on open formulas, the formulas conforming to recommendations of the state agricultural colleges in the operating territory.

"There is a shortage of fertilizer manufacturing facilities in the Midwest," Mr. Wysor stated, "and inability to obtain the quantity of fertilizer needed is seriously handicapping farmers in the production of food which is urgently needed."

The board also authorized improvements to the organization's fertilizer plant in Baltimore to increase capacity and improve operating efficiency, the cost of the improvements to approximate $150,000, and improvements to the Norfolk plant to cost about $75,000. Approval was given for the construction of a seed processing plant and additional warehouse facilities at Louisville, Ky., to cost $85,000. Similar improvements to provide seed cleaning facilities and additional storage space at Clarksburg, W. Va., will cost $135,000.

Nitrogen Allocations for 1945-1946 Announced

The War Production Board has notified fertilizer manufacturers east of the Rocky Mountains concerning the amounts of various nitrogenous fertilizer materials which will be allotted to them for the fertilizer year, July 1, 1945, to June 30, 1946.

Sulphate of ammonia and pulverized cyanamid will be allocated only for use in mixed fertilizers. Ammonium nitrate can be used for either mixing or for direct application.

Nitrogen compounds and anhydrous ammonia will be allocated monthly, so as to spread deliveries as nearly as possible over the entire year.

In making these allotments WPB expects to give a limited effect to preferences of fertilizer manufacturers and distributors for one material over another. Whenever the buyers prefer it, the board will substitute different allocations for those now being made on the following bases:

One car of anhydrous ammonia for one car of solution of UAL (urea-ammonia liquor).

Nitrate of soda (all grades), cal-nitro, and A-N-L (ammonium nitrate-limestone) for mixing in place of solution, ammonium nitrate, or sulphate of ammonia (substitution on an equivalent nitrogen basis).

Uramon for sulphate of ammonia on basis of 2 tons of sulphate of ammonia for 1 ton of uramon.

Pulverized cyanamid for sulphate of ammonia on basis of 1 ton of sulphate of ammonia for 1 ton of pulverized cyanamid.

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Transportation Limitations

Fertilizer manufacturers will find no immediate relief from transportation difficulties and they would do well to make broad allowances in ordering materials. In fact, transportation grows tighter with the progress of the war. Shifting from Europe and concentrating on Japan has lengthened rather than shortened the hauls and added to the burden of railroads as well as ships. Food and new equipment movements to devastated Europe will mean heavy transportation to the east coast ports and Army and Navy supplies, some of which must cross the entire country, will tax transportation to Pacific ports.

Even if the war with Japan should end soon, transportation facilities would still be heavily taxed to take care of the military forces and to rehabilitate the Far East, just as is occurring in Europe.

Railroads are overtaxed and in greater need of repairs and new equipment than ever before. The railroads have unquestionably done a magnificent job. But transportation remains a serious problem.

Perhaps fertilizer manufacturers will find it easier to get their goods delivered locally by trucks in view of the increased release of Army trucks to farmers and provided adequate gasoline is available for their operation.

The first and most serious problem is to get fertilizer materials to the plants, for which the only solution seems to be to order early.

Improve Old Rather Than Buy New Land

Farmers are always land hungry and when their buying power increases they usually spend it buying more land. Soil conservationists are now urging farmers to spend their extra cash on improving the land they have rather than on the extension of their acreage.

Farm land prices have advanced sharply during the war, largely because farmers and would-be farmers are bidding up prices. The same situation developed after the first World War. Much of the high-priced land was lost and reverted to farmer owners or land banks. It was a land tragedy.

Though the trouble is not as rampant as during the first World War, and prices have

not gone as high, they are at the danger point.

A new factor in farm prices is the non-farmer purchase of acreage on which to live while earning his living in town. They want the wide spaces of the country and depend upon transportation facilities for reaching the city. Economists are expecting an increasing trend of non-agriculturists to the countryside which will doubtless continue the pressure toward higher land prices.

Fertilizer manufacturers will regret a trend to higher land prices in which farm production is not the sole factor in establishing values. The new bona fide farmer will be handicapped by his over-investment in land, and many may be discouraged at the prospect and decline to buy.

When prices of farm products decline, of course, some of the inflation in farm land values will take place. By the same token the farmer becomes a poorer customer of plant food.

A slower subsidence of farm land prices may be expected this time than after the first World War because of the land-craze of city folk now growing at an inflationary rate. The movement countryward is certainly not helping agriculture.

Collings and Associates Start Consulting Service

A private consulting service for fertilizer manufacturers, dealers and others has been recently founded by Dr. Gilbeart H. Collings, author of the well-known book *Commercial Fertilizers—Their Sources and Use.* The organization was founded for the purpose of supplying expert advice at nominal cost to small manufacturers and dealers. The new organization is known as Collings and Associates, Fertilizer Consultants, and its address is 130 North Clemson Avenue, Clemson, S. C.

1945 Support Price Set for Cottonseed

The support price program for cottonseed established for the 1944 crop will be extended by the War Food Administration to cover the 1945 crop of cottonseed.

The support price is $56 per ton, f. o. b. shipping point in southeastern states.

The 1945 support price will be effectuated through an "open offer" by the Commodity Credit Corporation to support the market for cottonseed products. Operators of cottonseed crushing mills who accept the offer agree to pay for all cottonseed of the 1945 crop purchased in lots of five tons or more between August 1, 1945, and July 31, 1946, not less than the specified minimum support prices, f. o. b. shipping point, basis, "U. S. Standard Grades," subject to the rules, regulations, and standard methods covering the handling, sampling, and analysis of cottonseed for grading purposes established by the War Food Administration.

For all oil mills which accept the offer, Commodity Credit Corporation will support prices for cottonseed products through July 31, 1946, with an offer (1) to purchase cottonseed oil at one-eighth cent per pound below the ceiling price; (2) to purchase bulk cottonseed meal, 41 per cent protein minimum, at $44 per ton in Alabama, and (3) to purchase "chemical grade" linters at the ceiling price.

Prices actually received by growers will, of course, vary from time to time and by areas according to the quality of seed being marketed, the prices being paid by mills, and the ginners' margin in effect at the time of marketing.

Rates of Nitrate Side-Dressings for Cotton Compared

In a 16-year test of applying nitrogen as a side-dressing to cotton at the South Carolina Experiment Station, 100, 150, 200, 250 and 300 pounds of nitrate of soda were used on plots receiving normal applications of fertilizer at time of seeding.

Where no side-dressing of nitrogen was made, the average yield of seed cotton was 1,669 pounds. Yields above the check plot increased as the rate of nitrogen in the side-dressing increased. The average gain for 100 pounds of nitrate of soda above the check plot was 268 pounds of seed cotton; for 150-pound application, 351 pounds; for 200-pound application, 393 pounds; for 250-pound application, 425 pounds; for 300-pound application, 442 pounds.

"Based on 36 per cent lint at 20 cents per pound the gains in money value for the different rates over no side-dressing were as follows: 100-pound rate, $18.80; 150-pound rate, $25.26; 200-pound rate, $28.28; 250-pound rate, $30.60; 300-pound rate, $31.82," the station says.

Kieffer To Join Smith-Douglass Staff

Dale Kieffer, chief of the Agricultural Chemicals Division of the War Production Board, has submitted his resignation, effective July 28th, and will join the staff of the Smith-Douglass Company, Norfolk, Va. Mr. Kieffer will have charge of production and research and will be located at the home office of the company in Norfolk.

For the past three years he has been in charge of the distribution of fertilizer materials by WPB in carrying out the WFA food production program and has made a splendid record in helping the fertilizer industry meet the heavy wartime demand for plant food.

Mr. Kieffer will be succeeded in the WPB organization by W. F. Corey who has had charge of the distribution of superphosphate, and of elemental phosphorus and phosphates.

Fertilizing Strawberries in Florida

"Tests during 1940–41, 1941–42 and 1942–43 at the Florida Experiment Station Field Laboratory at Plant City, show that a total application per acre per season of 1,400 to 1,800 pounds of commercial fertilizer gave the best yields of fruit on the type of land used," states Bulletin No. 125 of the Station, recently issued.

Concerning the grades of fertilizers, this will vary with the soil and condition of the plants at time of application. "Usually," says the bulletin, "it is best to divide the total quantity of fertilizers to be applied for the season into three applications: 5–7–3 for the first application, 5–7–5 for the second application, and 3–7–7 for the third. Usually 400 to 600 pounds per acre are applied each time."

July Crop Report

Total crop production for the whole country promises to be well above average—not quite in the bumper class of 1942 and 1944, but higher than for any of the other years on record. Such was the outlook on July 1st, despite the sharp drop in cotton acreage, and the uncertain prospects for the late-planted corn and other spring crops in several important producing sections. Cool

(Continued on page 30)

Total Production (in Thousands)

Crop	Average 1934–43	1944	Indicated July 1, 1945
Corn, all....bu.	2,433,060	3,228,361	2,685,328
Wheat, all....bu.	789,080	1,078,647	1,128,690
Winter....bu.	585,994	764,073	834,189
All spring....bu.	203,085	314,574	294,501
Durum....bu.	29,330	31,933	27,217
Other spring.bu.	173,756	282,641	267,284
Oats....bu.	1,068,399	1,166,392	1,418,993
Barley....bu.	273,481	284,426	255,671
Rye....bu.	41,434	25,872	27,327
Flaxseed....bu.	21,684	23,527	32,728
Rice....bu.	52,346	70,237	74,784
Hay, all tame....ton	77,415	83,845	87,712
Hay, wild....ton	10,144	14,135	13,444
Hay, clover and timothy....ton	24,289	28,771	29,835
Hay, alfalfa....ton	28,604	31,702	32,522
Beans, dry edible...100-lb. bag	15,942	16,128	15,052
Peas, dry field....bag	3,976	8,873	6,532
Potatoes....bu.	375,091	379,436	408,034
Sweet potatoes...bu.	67,059	71,651	64,077
Tobacco....lb.	1,392,390	1,950,213	1,890,328
Sugarcane for sugar and seed...ton	5,640	6,148	6,840
Sugar beets....ton	9,644	6,753	8,919
Hops....lb.	39,240	47,695	54,756
Apples, commercial crop....bu.	119,046	124,754	69,962
Peaches....bu.	57,201	75,963	80,432
Pears....bu.	28,616	31,956	32,861
Grapes....ton	2,475	2,737	2,736
Cherries....ton	153	202	128

FERTILIZER MATERIALS MARKET

NEW YORK

Advance Orders Placed for Principal Fertilizer Materials Will Cover Most of Year's Production. Reserve Supplies of Phosphate Rock and Superphosphate Being Accumulated. Organic Materials Practically Out of the Fertilizer Market.

Exclusive Correspondence to "The American Fertilizer"

NEW YORK, July 13, 1945.

Sulphate of Ammonia

Shipments of sulphate of ammonia are continuing steadily on orders placed well in advance. Practically all allocation quotas are taken and only transportation problems are hindering the shipment of even greater tonnage.

Nitrate of Soda

Demand for this material for direct application is showing some decrease as the growing season advances. WPB has announced that adequate supplies should be available to take care of requirements for the next four months.

Organic Ammoniates

The menhaden catch in Chesapeake Bay and points north is proving to be better than expected. Almost all of this production has been contracted for in advance by feed producers. The same situation holds with other organics, with little going into fertilizer production.

Superphosphate

Producers have booked contracts for next season's requirements from practically all of the principal fertilizer mixers. While some of the smaller plants have curtailed production materially, most of the larger plants are operating to the extent of their labor supply in order to build up reserves for future shipments.

Phosphate Rock

Much improvement has been shown in transportation problems, both by rail and by sea. Superphosphate producers are maintaining a steady demand, both for current production and for reserve stockpiles. There has been a marked increase in export shipments during the past few weeks.

Potash

Almost all fertilizer mixers have placed orders for next year's requirements and this will about cover the anticipated production which continues at established high levels. Shipments against allocations are proceeding steadily.

CHICAGO

Inquiry for Fertilizer Organics Continues but No Supplies Available. Feed Market Firm at Ceiling Prices.

Exclusive Correspondence to "The American Fertilizer"

CHICAGO, July 12, 1945.

No change has occurred in the western organic market. Inquiry, particularly for later deliveries, continues, but response from sellers is lacking, leaving the situation as tight as ever.

Heavy demand with light production keeps the feed materials market very firm at ceiling prices. Hog feeds are now on a strictly allocation basis.

Ceiling prices remain unchanged:

High grade ground fertilizer tankage, $3.85 to $4.00 ($4.68 to $4.86 per unit N) and 10 cents; standard grades crushed feeding tankage, $5.53 per unit ammonia ($6.72 per unit N); blood, $5.53 ($6.72 per unit N); dry rendered tankage, $1.25 per unit of protein, f. o. b. producing points.

Ban on Burlap Fertilizer Bags Lifted

On July 10th, the War Production Board issued an amendment to the textile bag control order M-221 whereby fertilizer was added to the list of products which are permitted to be shipped in new burlap bags. No change was made in the provisions which have permitted the use of new cotton bags for packaging of fertilizers.

Nitrogenous Materials Kill Weed Seed In Composts

Seven years' experiments by the Rhode Island Experiment Station, in which calcium cyanamid, ammonium sulphate, cottonseed meal, Milorganite, and Agrinile were applied to compost, produce a reaction which destroys the germinating power of seeds contained in the compost.

As a result of its test, the Station states: "The following amounts of nitrogenous fertilizers per cubic yard, when mixed with the compost as it is being prepared for storage in bins or piles, should give adequate control of weeds, grasses, and clover: 85 pounds of Milorganite, 15 pounds of calcium cyanamid; 65 pounds of Agrinite or 25 pounds of sulphate of ammonia."

Taking Fertility Faster Than It Is Restored

In an address recently, Claude R. Wickard said: "Especially with high war production, we are taking more fertility out of the land than we are putting back with legumes, manure and commercial fertilizer.

"Studies made on Ohio land that has been cropped in the usual manner from 50 to 75 years show a 35 per cent drop in fertility. Farm land in Missouri has lost a third of its original productiveness through 60 years of cropping. There is land in Kansas where 30 years of farming has lowered productiveness by 25 per cent. If we want to be assured of a continuing food supply in this country, the whole nation, not just farmers, will need to take a constructive interest in building back soil fertility and in preventing erosion and repairing damage it has already wrought."

Fertilizing Asparagus in Illinois

Tests with twelve different grades of complete fertilizer carried on for six years by the Illinois Experiment Station, developed that 4–8–4 and 6–8–4 fertilizers had consistently produced the greatest number of marketable shoots. Applications of all fertilizers were made at the rate of 1,000 pounds per acre. July applications, after the close of the cutting season, proved most profitable though better results were obtained from 4–8–6 fertilizer when applied in April.

Kentucky Soils Need More Fertilizer and Lime

There will be a large increase in the use of fertilizing and liming materials in Kentucky, if farmers take advantage of the possibilities for improving their land, it is stated in the University of Kentucky College of Agriculture circular, "Opportunities in Kentucky Agriculture."

It is estimated that about 3,000,000 acres of Kentucky cropland have had a basic application of liming materials and 2,000,000 acres more do not need liming. The remaining 8,000,000 acres suited to crops would therefore require 16,000,000 tons of ground limestone for a basic application of two tons to the acre. Thereafter, about a ton to the acre would be needed every 8 to 10 years, or about 1,500,000 tons a year.

Full use of the land also would require about 1,200,000 tons of fertilizers a year, including about three times as much phosphorus as is now being used, about 15 times as much nitrogen and about 20 times as much potash.

"The manufacture, transportation and distribution of this additional fertilizer is in itself an important postwar opportunity," writers of the circular declare.

Smaller Cotton Acreage

The July 1st report of the Crop Reporting Board, U. S. Department of Agriculture, shows a decrease of almost 10 per cent in the acreage planted in cotton during the present season. A total of 18,355,000 acres is reported, compared with 20,354,000 acres in 1944 and an average of 26,359,000 acres during the 1934–43 period. Decreases in the principal cotton States were: Texas, 13 per cent; Mississippi, 2 per cent; Arkansas, 9 per cent; Alabama, 3 per cent; Oklahoma, 10 per cent; Georgia, 9 per cent; South Carolina, 6 per cent. Small increases were indicated in Arizona, New Mexico, and California.

Agronomic Items

Cotton requires sulphur, according to findings of the Georgia Experiment Station. Sulphur in ordinary superphosphate and sulphate of ammonia used in making mixed fertilizers, is not provided by concentrated superphosphate or other forms of nitrogen. Applications of sulphur and gypsum with sulphur-deficient fertilizers increased yields by 112 pounds of seed cotton per acre for sulphur and 197 pounds for gypsum.

Inoculation of the Spanish variety of peanuts seeded on land not previously planted to the crop consistently increased yields of hay and nuts, according to tests conducted by the Alabama Experiment Station. But greater increases from inoculation are shown when the crop is fertilized "conversely" says the station report, "increases from applications of phosphate and potash are slight if inoculation is withheld."

Value of Green Manuring Compared to Value of Hay Lost

Comparing corn yields following the turning under of roots and stubble with corn yields after whole crops were turned under, Cornell University Agricultural Experiment Station reports the results of a ten-year test.

Ten of the most common legumes, including annuals and perennials, were used as cover crops. Higher yields of corn followed the use of the whole cover crop than were obtained by turning under roots and stubble.

"In many instances," says the report, "the differences were too small to compensate for the sacrifice of the hay. This was particularly true of red clover, alfalfa, and sweet clover."

CLASSIFIED ADVERTISEMENTS

Advertisements for sale of plants, machinery, etc. and for help and employment in this column, same type as now used, 60 cents per line, each insertion.

HELP WANTED

WANTED: Foreman complete Superphosphate Department of large Eastern Fertilizer Company. Write full details, age, experience, salary expected, etc. Address "140" care THE AMERICAN FERTILIZER, Philadelphia 7.

WANTED: Superintendent, Assistant Superintendent, and experienced Foreman. Well-established and growing Company operating Complete Fertilizer Plant on Southeast Seacoast. Address "145" care THE AMERICAN FERTILIZER, Philadelphia 7.

WANTED: Superintendent for dry mixing plant about 15,000 tons. State experience, age, salary wanted. Small town. Address "150" care THE AMERICAN FERTILIZER, Philadelphia 7.

Nitrate of Soda as a Corn Fertilizer

Bulletin No. 196, Tennessee Agricultural Experiment Station, prepared by Director C. A. Mooers, reports and discusses the use of nitrate of soda in fertilizing corn in various soil areas in Tennessee.

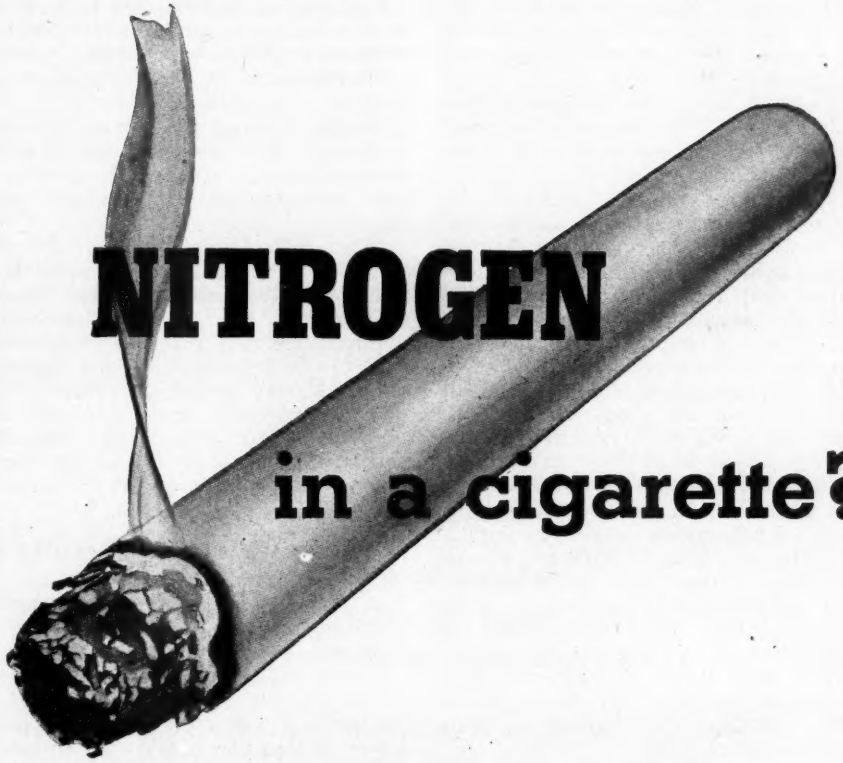
A long-time experiment at the West Tennessee Experiment Station on a fertile Lintonia soil covers a period from 1931 to 1944. The bulletin says that in order to insure an ample supply of phosphate and potash, 200 pounds of 16 per cent superphosphate and 50 pounds of muriate of potash per acre were applied annually to all plots. The application of nitrate of soda per acre was 100 pounds per acre annually.

The bulletin states that the average increase attributable to 100-pound application of nitrate of soda for the 14-year period is 11.8 bushels of corn and 0.24 ton of stover. Without nitrate of soda the average yields for the first seven years were 19.4 bushels, the second seven years the average was 15 bushels. The application of nitrate of soda the first seven years resulted in average yields of 32.2 bushels and for the second seven years 25.7 bushels. The lowest increase was 5.5 bushels per acre in the poor season of 1939 and the highest increase was 18 bushels in the favorable season of 1937.

In another series continued for ten years in which 120 pounds and 160 pounds of nitrate of soda per acre were applied, the average yield was 21.4 bushels without nitrate of soda. Where 120 pounds of nitrate of soda were used annually, the average yields were 33.7 bushels per acre, and where 160 pounds of nitrate of soda were used annually, the yield averaged 36.7 bushels per acre. The average increase from applying 120 pounds of nitrate of soda was 12.3 bushels per acre and from 160 pounds an average increase of 15.3 bushels per acre.

"In this set of experiments," says the report, "160 pounds of nitrate of soda per acre is indicated as nearly or quite the limit of profitable application."

From soils of moderate productivity at Murfreesboro, which had received a basic application of 200 pounds of 16 per cent superphosphate and 50 pounds of muriate of potash per acre, nitrate of soda was applied at rates of 80, 120, 160 and 200 pounds per



SURE, there's nitrogen in that cigarette . . . in any cigarette.

Tobacco quality—in fact, efficient production of the crop itself—depends on the right amount and the right kind of nitrogen.

Of course, right now, nitrogen has a big war job. Therefore, much of the nitrogen that normally goes into Du Pont Urea-Ammonia Liquors and "Uramon" Fertilizer Compound is no longer obtainable for this purpose.

But now is the time to study the uses of urea nitrogen. This type of nitrogen is especially ideal for tobacco and for most other growing crops. Consult with our service representatives at your convenience. Write E. I. du Pont de Nemours & Co. (Inc.), Ammonia Dept., Wilmington 98, Delaware.

FOOD FIGHTS FOR FREEDOM

DU PONT
UREA-AMMONIA LIQUORS
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DU PONT BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

*REG. U. S. PAT. OFF.

acre for a period of seven years.

No-nitrate yields averaged 27.8 bushels per acre; 80 pounds of nitrate yielded an average of 29.3 bushels per acre; 120 pounds, 30.8 bushels per acre; 160 pounds an average of 31.9 bushels per acre, and 200 pounds, 31.3 bushels per acre. "The responses to nitrate," says the report, "were too small to be profitable."

On a better type soil—the Decatur—corn following clover and grass, and unfertilized, yielded 39 bushels per acre in a 4-year test. With 200 pounds of 16 per cent superphosphate the yield averaged 46.3 bushels per acre. With 200 pounds of superphosphate and 100 pounds of nitrate of soda, the yield averaged 46.6 bushels per acre. With 200 pounds of superphosphate and 25 pounds of muriate of potash the yield averaged 44.8 bushels per acre. When 100 pounds of nitrate of soda were added to 200 pounds of superphosphate and 25 pounds of muriate of potash, the yield was 45.2 per acre.

On recently cleared lands of the Cumberland Plateau, very little response to nitrogen was observed the first year. Some response occurred the second year, and on the third year the response was characterized as "excellent."

Data on time of top-dressing corn with nitrate of soda led the author to the conclusion that the application should be made when the corn is knee high.

Fertilizer Solution Compared to Hormones On Onions

A fertilizer solution of 1 pound of standard 4–12–4 fertilizer dissolved in 10 gallons of water was compared with four different hormone preparations on Spanish sweet onions, at the Colorado Experiment Station. A check plot received no treatment.

The fertilizer solution was applied at the rate of one-half pint at the time of the transplanting. Hormones were applied as recommended by the manufacturers.

Excessive rainfall resulted in poor stands in all plots, but in almost every instance the treatments resulted in the highest yields, also the largest bulbs, regardless of the percentage of stand.

The fertilizer solution, or starter solution, treatment "was the only treatment which produced yields significantly greater than those of the untreated control plot," says the report.

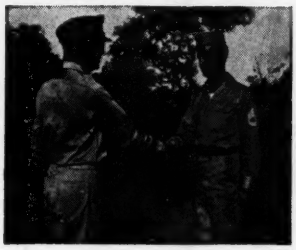
"The bulbs from the starter solution treatment were significantly larger than the bulbs from plots under any other treatment.

"The data from this one season's field tests indicate that a 4–12–4 starter solution was the only treatment which significantly increased the yield per plot of sweet Spanish onion transplants over the untreated control plots, and also significantly increased the weight per bulb over any of the hormones tested," the report states in conclusion.

Tomato Fertilizer Results in Delaware

Delaware Bulletin 244 reports results on fertilizing tomatoes, a project carried on in cooperation with Libby, McNeil and Libby Company. The conclusions were as follows:

"(1) Largest yields were obtained when the fertilizer was applied in one application before setting the plant; (2) Broadcasting 1,200 lb. of a 4–8–8 fertilizer mixture on top of the soil and plowing it under was the most desirable treatment—this treatment produced significantly greater yields than all others; (3) An application of 2,000 lb. of a 4–8–8 fertilizer per acre was not economical; (4) Side-dressing with nitrate of soda did not significantly increase the yield of tomatoes; and (5) the minus potash treatment reduced the yields more than minus nitrogen or minus phosphorus."



The Pace of Victory Permits Only A Congratulatory Handshake!

American Industry merits a decoration for its fine record in the Mighty 7th! But, as our newly decorated Pacific heroes return to combat, so industrial leaders are back into Bond action—consolidating Payroll Savings Plan gains!

> Many are working to keep all new subscribers to the Payroll Savings Plan. By selective resolicitation each is being urged to maintain his Bond buying allotment. Many are also using selective resolicitation to urge all workers who increased their subscriptions to continue on this farsighted basis.

Help to curb inflationary pressures and harvest peacetime prosperity by holding your Payroll Savings Plan to the mark set in the Mighty 7th!

Good Pastures Require Phosphates in East Texas

"The key to good pasturage and good livestock development in the area is superphosphate and clovers," states the Texas Experiment Station in a bulletin, "Pasture Development in the East Texas Timber Country," recently issued.

The bulletin states that 80 to 100 pounds of phosphoric acid per acre is generally recommended as the initial application. In the case of the Lufkin bottom-land pastures, applications over three years amounted to 222 pounds per acre.

Results indicate that phosphorus is the first limiting element and that phosphate alone will permit the establishment of white clover, hop clover, and grass pasturage.

"Apparently the main reason why livestock fail to develop good scale on native pasturage in the region is that the forage is deficient in feeding value much of the year. Improved fertilized pastures provide more feed and feed of higher quality for a longer period than native pastures," the bulletin concludes.

Fertilizers on Wheat, Sugar Beets, and Alfalfa in Montana

Indications from tests conducted with small applications of phosphate and nitrogen fertilizers on winter wheat, sugar beets, and alfalfa are that fertilizers will pay, according to data given in the Annual Report of the Montana Agricultural Experiment Station.

With winter wheat on a dry land area of Cascade County, the no-fertilizer plot produced 27.8 bushels. With 25 pounds of treble superphosphate, the yield was 36.8 bushels per acre, an increase of 32.5 per cent over the check.

At Judith branch station (dry land) the check plot produced 47.4 bushels of wheat per acre. An application of 75 pounds of ammoniated phosphate (6–30) produced 58.8 bushels, a 24.1 per cent increase, while 25 pounds of treble superphosphate produced 55.8 bushels per acre, a 17.7 per cent increase.

In Gallatin County on irrigated land, the check produced 29.2 bushels per acre With an application of 100 pounds of treble superphosphate, the yield was 56.7 per cent or 94.3 per cent increase

Sugar beets on irrigated land in Ravalli County produced 22.4 tons on the unferti-

HIGRADE
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62/63% K_2O

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SUNSHINE STATE POTASH
A PRODUCT OF NEW MEXICO U.S.A.

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The farmers of the country have been working hard to meet the increased demands of the Armed Forces and our Allies. Most of them are pretty tired . . . but the soil isn't. The soil continues to produce above-average crop yields for farmers because of the aid of fertilizers ... most of them compounded with potash. Potash is the vital soil nutrient which provides increased soil fertility and greater resistance to disease and drought.

Sunshine State Potash is playing a most important part in helping the soil yield the essential crops season after season.

UNITED STATES POTASH COMPANY
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lized check. A complete fertilizer applied at the rate of 250 pounds per acre produced 26.6 tons per acre, or 18.6 per cent increase.

In Cascade County, sugar beets on the check plot produced at the rate of 8.5 tons per acre, while 250 pounds of complete fertilizer produced 12.1 tons, or 43.4 per cent increase. Where 100 pounds of treble superphosphate and 100 pounds of ammonium sulphate were used, the yield was 10.6 tons, a 24.8 per cent increase.

In Yellowstone County the yield of sugar beets on the check plot was 10.4 tons. An application of 100 pounds of treble superphosphate resulted in a yield of 14.7 tons, or 41.2 per cent increase. With 100 pounds of treble superphosphate, 100 pounds of ammonium sulphate and 20 pounds of boron, the yield was 16.5 tons, or 58.5 per cent increase. Use of 250 pounds complete fertilizer gave 14.8 tons, or 42.4 increase.

Alfalfa on irrigated land in Teton County produced 1.39 tons per acre (second cutting). With 100 pounds of treble superphosphate, the yield was 1.88 tons, or 35.2 per cent increase. Applied at the rate of 200 pounds per acre, treble superphosphate yielded 1.99 tons or 43.2 per cent increase.

Value of Phosphate Carriers in Western Washington Soils

The Annual Report of the Washington State Experiment Station states that legumes are able to make use of phosphates sometimes classed as "insoluble."

Sweet corn on Monroe silt loam showed, according to the report, that corn was unable to utilize the phosphoric acid in rock phosphate. Results indicated that ammonium phosphate, treble superphosphate and potassium metaphosphate were superior to calcium metaphosphate and dicalcium phosphate.

On canning beets, rock phosphate was of little value. Ammonium phosphate was best and dicalcium phosphate and potassium metaphosphate while not as good as ammonium phosphate were considerably better than calcium metaphosphate.

With Swiss chard, ammonium phosphate was best. Potassium metaphosphate and dicalcium phosphate gave similar yields, lower than ammonium phosphate, but considerably higher than those obtained with calcium metaphosphate or rock phosphate.

New York Fertilizer Recommendations for Grain

Cornell Extension Bulletin 650 treating of fertilizers for fall-sown grains says: "Present grain prices justify the use of mixed fertilizers containing nitrogen except where manure is applied or where the land was in legume sod the previous year. On land not manured and not immediately following a legume crop, use 250 lb. of 4–12–4 or 4–12–8. Use double these amounts if accompanied by a grass or legume seeding intended to be left down two or more years. On manured land use 300 lb. of 20 per cent superphosphate or its equivalent. Increase this to 500 lb. if two or more years of hay are to follow. Where winter grain follows a legume sod, use 300 lb. of superphosphate or a similar amount of 0–20–10 or 0–16–8. If two or more years of hay are to follow, increase these amounts to 500 lb. The high-potash formulas are recommended only for the lighter types of soil."

Fertilizing Alfalfa

"Use an abundance of plant food—the equivalent of 800 to 1,000 pounds of 0–12–12 or 2–12–12 fertilizer per acre," says the Virginia *Extension News* in discussing the establishment of alfalfa. The statement continues: "One of the most successful methods has been to plow or disk under one-half on top of the bed and the other half on top of the seed bed. Apply 15 to 20 pounds of borax per acre with the fertilizer.

"If you did not top-dress your alfalfa this spring, top-dress it after the next cutting. Use 400 pounds of 0–12–12 fertilizer and 10 pounds of borax per acre," the report adds.

JULY CROP REPORT

(Continued from page 16)

weather over most of the country during much of June slowed plant development and further delayed maturity. This weather was decidedly unfavorable for corn in the North Central States. Notwithstanding, the weather was good for small grains which had reached the filling stage, almost ideal for hay and pasture growth, and excellent for production of milk and eggs. There is need for warmer and drier weather in most of the northern half of the country, and for liberal rains in the Southwest and locally in the Southeast. Combined acreage of all crops is the second largest since 1932 and indicated yields of most crops are well above average.

Though aggregate total crop production for 1945 is not rated a record, the outlook for a number of individual crops is for record or near-record production. There are important increases in some vitally needed commodities: food grains, sugar and flaxseed. Big crops of potatoes, tobacco and several of the fruits and vegetables are in prospect. The wheat crop at 1,129 million bushels is an all-time high. There is a record crop of rice, but a smaller than average rye crop. The combined output of four food grains is expected to be the largest ever produced. The tonnage of truck crops for market may equal or slightly exceed the record volume produced in 1944. The expected total of 101 million tons of hay would be second only to the 105 million tons produced in 1943. The prospective oats crop would be the largest in 25 years. Above-average yields per acre are indicated for barley, rye, sugar beets, sugar cane, peas, tobacco, potatoes, sweet potatoes, and a considerable number of the vegetable crops. As the full effects of earlier adverse weather become apparent, combined tonnage of delicious fruits is expected to be slightly less than average. July 1st conditions point to a corn crop of only 2,685 million bushels—543 million below last year's record. Hence, production of feed grains is indicated to be below the record volumes of the last three years, but above most other years.

The total acreage of 52 crops for harvest as indicated on July 1st, approximates 350 million acres. This total is only about 2.2 million acres below the big acreage harvested in 1944, and would be the second largest since the years 1928 to 1932, when the acreages harvested ranged between 351 and 362 million acres.

APPLYING EXPERIMENTAL WORK TO COTTON FARMING

(Continued from page 9)

One individual alone cannot reap the full benefits from such a program but if adopted over an area, all growers in the area can benefit through increased demand for the high quality cotton they produce collectively.

This discussion would not be complete without at least mentioning the fact that seed treatment is an additional insurance toward obtaining good stands which no cotton farmer can afford to omit. Insect control will require special attention in certain years.

In conclusion, one is not justified in saying that the North Carolina farmer cannot compete in cotton production until he has made full use of all the information now available, or which is obtained later, that will contribute to lower production costs per pound. If then, cost of production exceeds price, or if other enterprises are more profitable, a shift will take place.

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BUYERS' GUIDE • A CLASSIFIED INDEX TO ALL THE ADVERTISERS IN "THE AMERICAN FERTILIZER"

This list contains representative concerns in the Commercial Fertilizer Industry, Including fertilizer manufacturers, machinery and equipment manufacturers, dealers in and manufacturers of commercial fertilizer materials and supplies, brokers, chemists, etc.
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Barrett Division, The, Allied Chemical & Dye Corp., New York City.
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Sackett & Sons Co., The A. J., Baltimore, Md.
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Utility Works, The, East Point, Ga.

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